REMARKS

Applicant has cancelled claim 3, 5, 6 and 14, rewritten claims 7, 9 and 12 in independent form and amended claims 8 and 13 to be dependent on claim 7 and 12 respectively. Original claims 10, 11 remain in the application.

In the aforementioned Office Action the Examiner rejected previously submitted claims 3, and 5-14 under 35 U.S.C. 103(a) as being unpatentable over U.S. 2003/004017 A1 to Fonash et al. In making that rejection the Examiner stated:

> …Fonash et al. teach a method for manufacturing a device which comprises forming a lower electrode (14) on a substrate; forming a sacrificial layer pattern on the substrate including the lower electrode (16); forming an upper electrode (16); forming an upper electrode on the substrate including the sacrificial layer pattern (18); removing the sacrificial layer so that a nano gap (20) is formed between the lower electrode and the upper electrode; and adsorbing conductive organic molecules (21) between the upper electrode and the lower electrode in the nano gap. (See Figure 1; Sections 0012, 0015, 0035 and 0048). Fonash et al describe well known scribing, machining, embossing, oblation, and lithography. Fonahs et al do not describe forming a polymer pattern with the particular line width of 50nm, however this is a size limitation which could have been performed by electron beam etching and would have been obvious at the time applicant's invention was made to a person of ordinary skill in the art because the size is suitable for the manufacture of a molecular scale device.

It is respectfully submitted that what Fonash et al does is to form a second sacrificial layer

(16), cap of channel or insulator layer (17), top electrode (upper layer of nano gap or port 18 and a capping layer 19 and positioning contacting gap structure 20, molecules 21 moved to gap structure through hole structure 23 and fluidic channel 22 as set forth in paragraph 0035.

It is respectfully submitted that currently amended claims 7, 9 and 12 and dependent claims 8, 10, 11 and 13 are clearly and patentably distinguished over the cited art.

To be more specific, amended claim 7 now calls for:

a)providing a substrate of a resistive insulating material having an upper surface and forming a lower electrode on the upper surface of the substrate;

b)forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode;

c)using a photo etching technique to remove a portion of the sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode;

d)covering the entire remaining surface from step c including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50nm by an electron beam etching technique to expose the sacrificial layer and the substrate on which the lower electrode is formed;

e) forming an upper electrode by depositing metal on an entire upper surface from step d and removing metal on the polymer pattern by a lift-off process so that an upper electrode is formed and the sacrificial layer surrounds the lower electrode and is on an exposed portion of the insulator;

f) removing the sacrificial layer so that a nanogap is formed between the upper electrode and the lower electrode; and

g) adsorbing conductive organic molecules between the upper electrode and the lower electrode;

wherein the sacrificial layer pattern is formed of the organic material, the oxide film or the metal, of a multilayer structure having different etching selection ratios and the sacrificial

layer pattern being formed in a nanometer thickness. It is Applicant's contention that this unique combination is not disclosed or suggested by the prior art.

Further, as currently amended claim 9 calls for a method including the steps of:

a)providing a substrate of a resistive insulating material having an upper surface and forming a lower electrode on the upper surface of the substrate;

b)forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode;

c)using a photo etching technique to remove a portion of the sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode;

d)covering the entire remaining surface from step c including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50nm by an electron beam etching technique to expose the sacrificial layer and the substrate on which the lower electrode is formed;

e) forming an upper electrode by depositing metal on an entire upper surface from step d and removing metal on the polymer pattern by a lift-off process so that an upper electrode is formed and the sacrificial layer surrounds the lower electrode and is on an exposed portion of the insulator;

f) removing the sacrificial layer so that a nanogap is formed between the upper electrode and the lower electrode; and

g) adsorbing conductive organic molecules between the upper electrode and the lower electrode; and

wherein the conductive organic molecules are adsorbed while the substrate is immersed in a solution in which the conductive organic molecules are dissolved.

To be more specific, currently amended claim 9 now calls for a unique combination which includes the steps of providing a substrate of resistive insulating material having an upper

surface and forming an electrode on the upper surface of the substrate. The Claim also calls for forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode; and using a photo etching technique to remove a portion of the sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode.

Currently amended claim 12 also calls for covering the entire remaining surface from step c including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50 nm by an electron beam etching technique to expose the sacrificial layer and the substrate on which the lower electrode is formed. It is respectfully submitted that this step is not disclosed or suggest by the cited reference.

In addition to the above, currently amended claims 9 calls for forming an upper electrode by depositing metal on an entire upper surface from step d and then removing metal on the polymer pattern by a lift off process so that an upper electrode is formed on the sacrificial layer surrounding the lower electrode and an exposed portion of the insulator. Removing the sacrificial layer so that a nano gap is formed between the upper electrode and the lower electrode and adsorbing conductive organic materials between the upper electrode and the lower electrode are also claimed. It is respectfully submitted that this is a unique combination of elements that is not disclosed or suggested by the prior art. Further, currently amended claim 9 calls for wherein the conductive organic molecules are adsorbed while the substance is immersed in a solution in which the conductive organic molecules are dissolved. It is Applicant's contention that this concept is not disclosed or suggested by Fonash et al. Accordingly, it is Applicant's contention that currently amended claim 9 and dependent Claims 10 and 11 should be allowed.

It is also Applicant's contention that currently amended claim 12 includes the unique combination of providing a substrate of resistive insulating material having an upper surface and forming a lower electrode on the upper surface of the substrate. The Claim also calls for forming a predetermined size of a sacrificial layer pattern on an entire upper surface of the substrate including the lower electrode; and using a photo etching technique to remove a portion of the

sacrificial layer excluding a predetermined area covering the lower electrode so that the sacrificial layer surrounds the lower electrode. Currently amended claim 12 also calls for covering the entire remaining surface from step c including the sacrificial layer surrounding the lower electrode with a polymer and forming a polymer pattern with a line width of 50 nm by an electron beam etching technique to expose the sacrificial layer and the substrate on which the lower electrode is formed. Further, amended claim 12 calls for wherein the conductive organic molecules are adsorbed, a current flowing through the lower electrode and the upper electrode is sensed so that weather and how much to adsorb is observed. It is respectively submitted that this concept is not disclosed or suggested by Fonash et al. Accordingly, claims 12 and 13 should be allowed.

Since claims 7-13 are now in proper form and clearly distinguished over the cited art, prompt favorable action is requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
LOWE HAUPTMAN & BERNER, LLP

/Yoon S Ham/
Yoon S. Ham
Registration No. 45,307

Customer Number: 22429
1700 Diagonal Road, Suite 300
Alexandria, Virginia 22314
(703) 684-1111
(703) 518-5499 Facsimile
Date: May 29, 2007